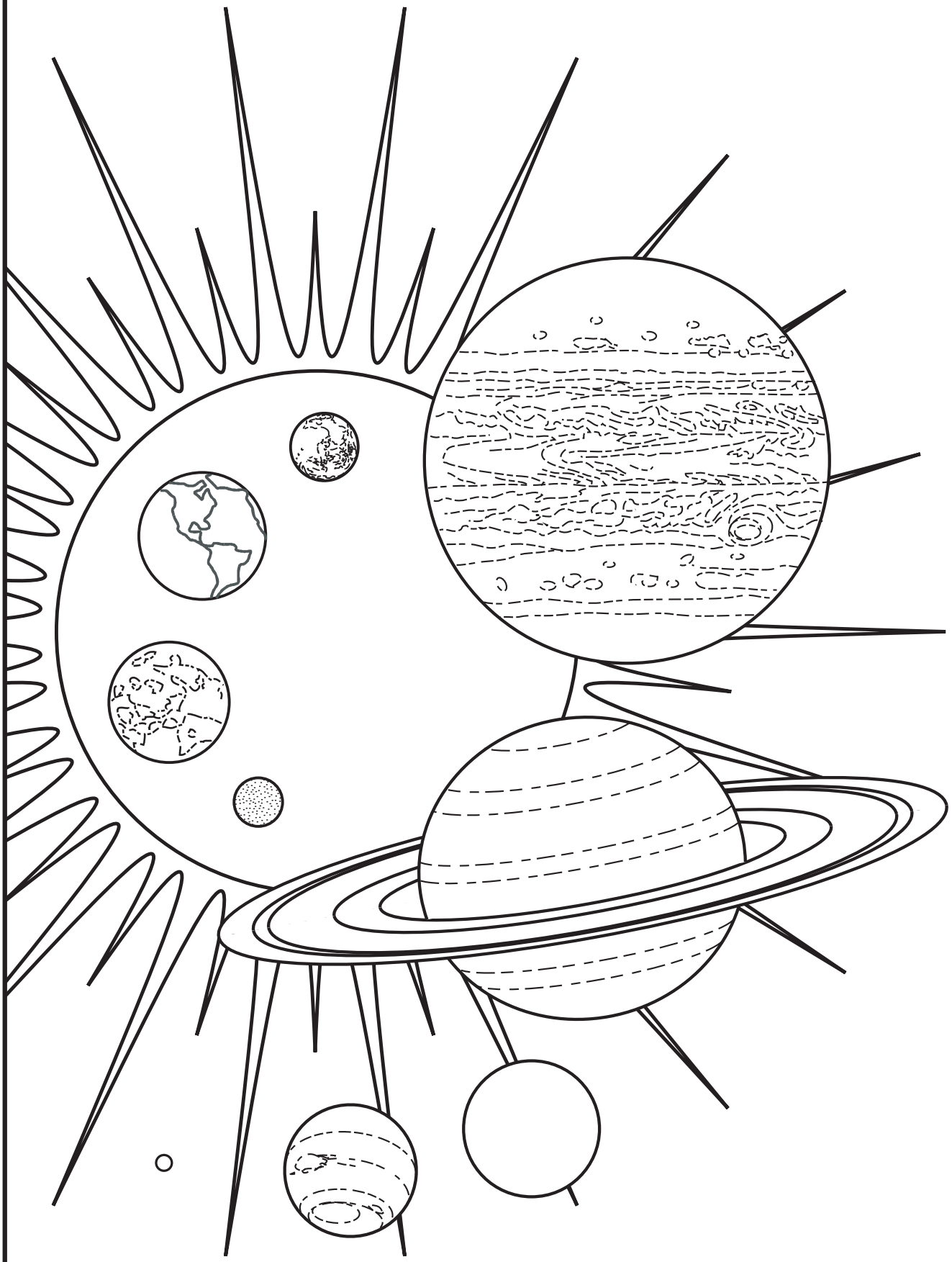
National Aeronautics and Space Administration



Our Solar System and Beyond

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Mercury

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Venus

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Earth

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Mars

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Jupiter

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Saturn

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Uranus

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Neptune

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

Compare and Contrast the Planets

Planetary Check List: Twenty Questions About the Planets

Planet: Pluto

A. Planet

1. Distance from Sun compared to Earth's distance: Closer___ Farther___
2. Size compared to Earth: Smaller ___ Larger ___
3. Length of year: _____
4. Length of day: _____
5. Surface: Yes ___ No ___ Don't know ___
6. Color of planet: _____
7. Temperature compared to Earth's temperature: Warmer___ Cooler____
8. Impact craters: Yes ___ No ____
9. Volcanic craters: Yes ___ No ___
10. Polar caps: Yes___ No___
11. Surface liquid water: Yes ___ No ___
12. Life: Yes ___ No ___

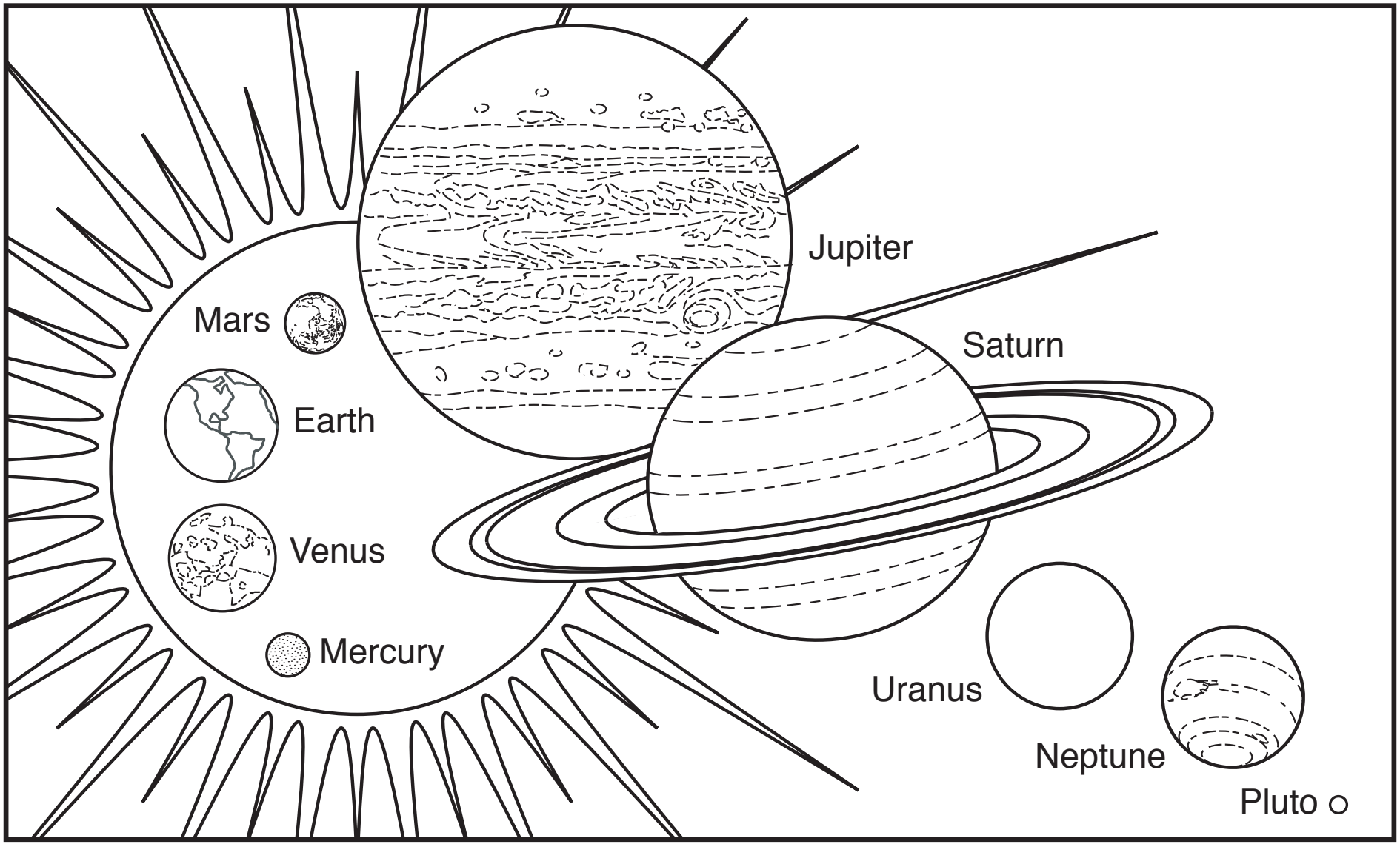
B. It's Atmosphere

13. Atmosphere: Yes ___ No ___
14. Mass of atmosphere compared to mass of Earth's atmosphere:
    Thinner ___ Thicker ___
15. Clouds: Yes ___ No ___
16. Composition of clouds: Water vapor ___ Sulfuric acid ____
    Frozen gases ___ Wind-blown dust ___
17. Composition of atmosphere: Nitrogen ___ Oxygen ___
    Carbon dioxide ___ Hydrogen ___ Helium ___

C. Other Facts

18. Visible without telescope: Yes ___ No ___
19. Number of moons: _____
20. Rings: Yes ___ No ___

National Aeronautics and Space Administration

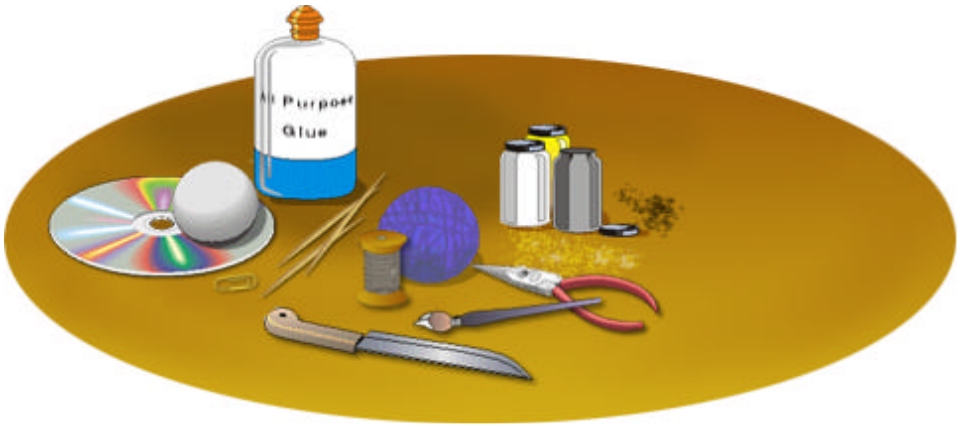


Our Solar System

www.nasa.gov

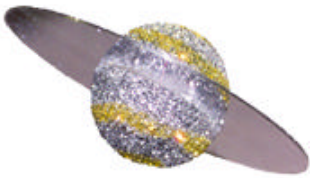
How to Make a Model Saturn

You can make a lovely model of Saturn and her rings. You can hang your model Saturn from the ceiling and watch it gracefully turn with the air currents. Or your Saturn will make a beautiful holiday decoration. Our samples are just suggestions. Decorate your Saturn and rings however you want.



You will need:

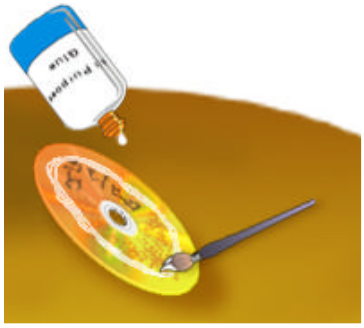
- One unwanted compact disc (CD). (Many people get these free in the mail.)
- One 2-inch diameter styrofoam ball, carefully cut in half with a sharp knife (get adult help, please!)
- White glue
- Wooden toothpicks
- Paint brush, about 1/4 to 1/2 inch wide
- Glitter—silver, gold, black or any other colors you want
- Yarn, black or other colors (optional)
- Needle-nosed pliers (or scissors will do)
- Small paper clip
- Thread



What to do:

First, decorate the rings:

- The CD will be Saturn's rings. Usually one side of the CD has printing on it. This is the side you will decorate with glitter.
- Try not to get glitter in the center part of the CD, where you will be gluing the styrofoam ball.
- Rinse the paintbrush out between uses, so it will stay soft and easy to use.
- Use the paintbrush to carefully spread glue on the CD. If you want to make it look like some of the rings are silver



and some gold, spread the glue only where you want to put the first color, then sprinkle the glitter on the wet glue. Let it dry completely. Then repeat for the remaining areas. You can use as many different colors as you want. Just be sure to let the glue dry completely for each before adding the next color.

- If you want to use yarn also—for example, black to show the gaps in the rings—glue it on and let it dry before adding the glitter.

Decorate Saturn:

- Stick a toothpick into the flat side of each half of the styrofoam ball to give yourself a handle.
- Use the paintbrush to apply glue and glitter on each half, as you did for the CD. Let the glue dry completely.

Put the pieces together:

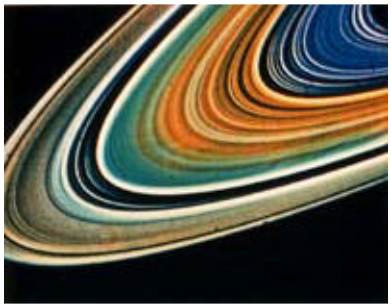
- Take the toothpick out of one of the styrofoam halves. On the other half, make sure the toothpick is stuck exactly into the center and push it in until it starts to poke out the top.
- Spread glue in the center of the decorated side of the CD. Pick up the CD and place the styrofoam half with the toothpick exactly in the center of the CD, toothpick sticking through the hole.
- Now push the other styrofoam half onto the toothpick sticking out the hole on the other side of the CD. When both halves are flat against the CD, a small part of the toothpick will be sticking out one of Saturn's "poles." Break it off with the pliers.

And hang it up:

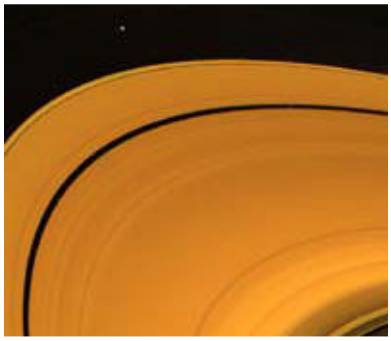
- Open a small paper clip so it looks like this:
- Decide which half of Saturn you want to be the top. Since Saturn's axis is tilted 28 degrees, stick the paperclip into the top about 3/4 inch away from the center (where the toothpick comes through). Angle the paperclip so it passes through the hole in the CD and helps hold the two styrofoam halves together.
- When you hang your Saturn up, and it turns in the breeze, you will see the "rings" from different angles, just as we see the real Saturn at different angles from Earth.
- Tie any length of thread to the paperclip and hang your model wherever you like.

Why does Saturn have rings?

Saturn tips her jaunty hat.



The small color differences in Saturn's rings have been enhanced in this picture from Voyager 2 data.



This Voyager 2 picture shows the gap in the rings called the Cassini Division.

Artist's idea: Cassini releasing Huygens Probe over Titan.

Scientists have ideas about why Saturn has rings, but no one knows for sure.

What are Saturn's rings made of? Are they solid like the CD you used to make your model? Or are they made of many particles dancing in formation around the planet?

Three robotic spacecraft from Earth have already visited Saturn—Pioneer 11, Voyager 1, and Voyager 2. They revealed many surprising things about Saturn's rings.

The rings are about 40,000 kilometers (24,000 miles) wide. That's about three Earths across. But the rings are only 100 meters (330 feet) thick.

They range from particles too tiny to see to "particles" the size of a bus. Scientists think they are icy snowballs or ice covered rocks.

There are actually many rings—maybe 500 to 1000. There are also gaps in the rings. (That's why we put some black rings on our model Saturns.)

A new spacecraft is now on its way to study Saturn much more thoroughly than the earlier spacecraft could. After a seven-year journey, the Cassini (ka-SEE-nee) space-craft will arrive at Saturn on July 1, 2004. It will go into orbit around Saturn and study its rings, its many moons, and the planet itself.

Cassini also carries a probe, called Huygens (HOY-guns), that will parachute into the atmosphere of Saturn's giant moon Titan. Huygens will send back information on this strange world whose surface we have never seen.

What exciting new discoveries Cassini and Huygens will make!

To learn more about this mission to Saturn and find other "spacey" things to do, see The Space Place web site at **http://spaceplace.nasa.gov.**

To download the Saturn model directions, see the web site **http://spaceplace.nasa.gov/en/kids/cassini_make1.shtml.**

Recipe for a Galactic Mobile

You might need help from an adult or older friend for this one.

What you need:

* 12" (family size) or 7" (individual size) round cardboard from frozen pizza box. (Or cut circle from a cardboard box.)
* 4 large sheets (11" x 17") black construction paper
* Glitter--gold, silver, red, orange, yellow, blue, purple, or any other colors you like
* White glue
* Paintbrush, about 1/4 to 1/2 inch wide
* Scissors
* Thread (black is best) or fine nylon fishing line
* Small, 4-holed button

* Large, sturdy sewing needle
* 16 sequins or very small beads, black is best (optional)
* Tape measure or yard (meter) stick
* **Pattern for galaxies.**

First, make the galaxies:

1. Print out the patterns for the galaxies.
2. Cut the galaxy patterns apart on the dotted lines.
3. Use the patterns to cut each galaxy out of construction paper. If you are making a "family size" mobile, use all 12 galaxies. For an "individual size" mobile, use only 9 galaxies. Here's one way to cut out the galaxies:

First cut out a small square of construction paper a little larger than the pattern paper. Tape the edges of the pattern to the construction paper so it doesn't slip when you cut. Now, cut out the galaxy, cutting through both the pattern and the construction paper.

4. Now decorate the galaxies with glitter. Imagine each speck of glitter is a star!

Use the brush to spread the glue on one side of one galaxy. Sprinkle one or two colors of glitter on each. Remember, galaxies are brighter in the center (where the stars are younger and hotter), becoming fainter at the edges or on the spiral arms.

5. When you have decorated one side, set the galaxy on something it won't stick to when the glue is dry! (Like a cookie sheet, for example.)
6. When you have decorated one side of each galaxy, let the glue dry. Then turn them over and decorate the other side. Be sure to leave them laying flat until the glue is completely dry. Otherwise, the spiral arms will droop. (If they do, when they are dry you can set a heavy book on them for a while.)

While you wait for the glue to dry . . .

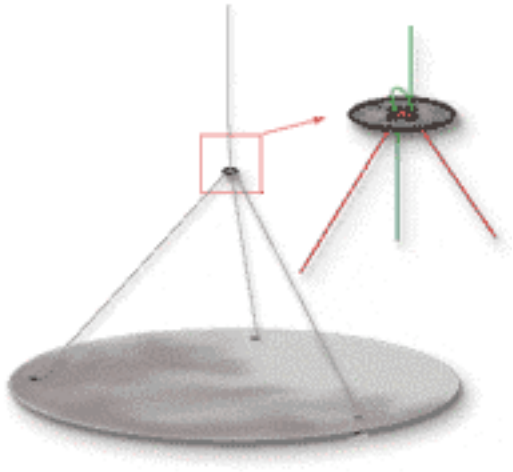
Make the frame for the mobile:

7. Use the round pizza cardboard as a pattern to draw a circle in the center of each of two pieces of construction paper. If the paper is big enough, cut the two paper circles a little larger than the cardboard.

8. Glue the paper circles to the top and bottom of the cardboard. If the paper circles are large enough, glue their edges together so the edge of the cardboard is also covered.

Note: Instead of covering the cardboard with paper, if you wish, you can paint both sides of the cardboard with flat black spray paint.

9. Make three pencil marks equally spaced around the edge of the circle, about 1 inch in from the edge.



10. Cut a length of thread about 2 feet long. Thread the needle, and either tie a fat knot in the end or tie a sequin or small bead to the end (include only one strand of thread).

11. Poke the needle through one of the pencil marks on the edge of the cardboard circle. Pull the thread through to the knot, sequin, or bead.

12. Take the 4-holed button and poke the needle up through one hole in the button and down through another.

13. Now poke the needle back down through another pencil mark on the circle (since the mark will be on the wrong side of the circle, you'll have to poke the needle up the other way first just to mark the hole).

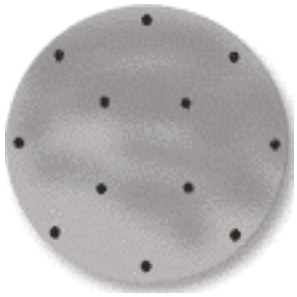
14. Unthread the needle and tie a fat knot, sequin, or bead in the end of the thread.

15. Now, cut a length of thread about 3 feet long and rethread the needle. Again, tie a fat knot, sequin, or bead in the end. Poke the needle up through the remaining pencil mark on the circle. (Knots, sequins, or beads should all be on the same side.)

16. Poke the needle up through one of the remaining holes in the button and then down through the last hole. Unthread the needle and tie a loop in the end of the thread for hanging the mobile from the ceiling.

Hang the galaxies from the mobile frame:

17. Make pencil marks on the bottom of the cardboard circle where you will be attaching each galaxy. For a 12-inch mobile, you could put eight evenly spaced around the edges and four evenly spaced in the center area. For a smaller mobile, you could put six around the edges and three in the center.



For each galaxy:

18. Cut a length of thread and thread the needle. Tie a knot, sequin, or bead to the end. Draw the needle through the center of the galaxy. Now poke the needle through one of the marks on the circle. Adjust the length of the thread so the galaxy hangs nicely, then cut the thread and tie a knot, sequin, or bead in the end.

19. Make the galaxies hang at different levels, so they can turn freely without hitting each other.

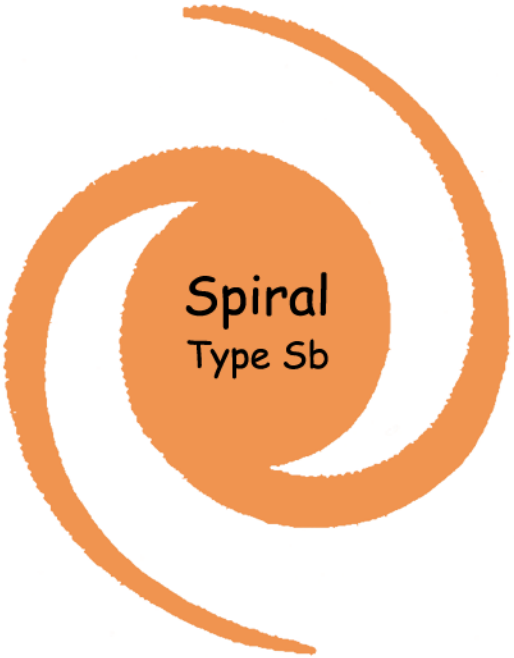
20. Hang your Galactic Mobile from the ceiling. Notice that you can adjust the thread going through the button to make the circle hang level.

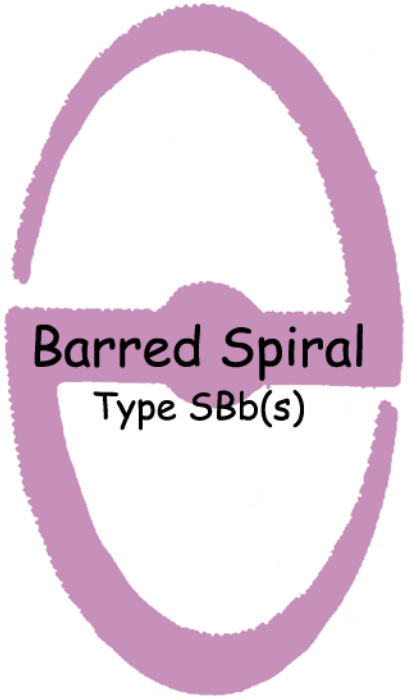
http://spaceplace.nasa.gov/en/kids/galex_make2.shtml


Spiral
Type Sa

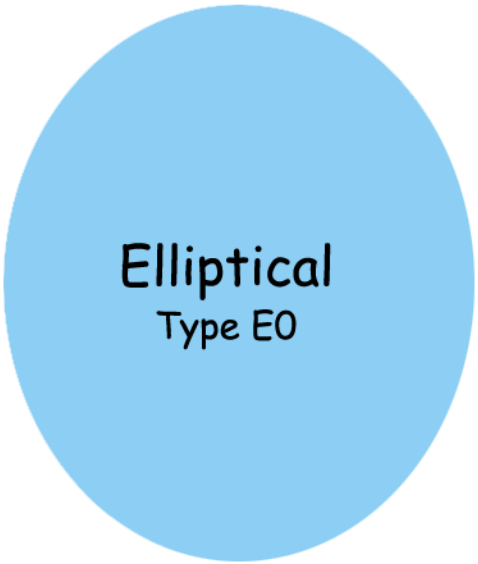

Spiral
Type Sc

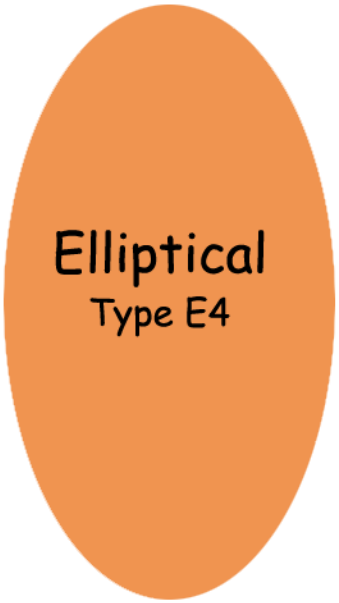

Barred Spiral
Type SBb


Spiral
Type Sb


Barred Spiral
Type SBb(s)


Barred Spiral
Type SBc


Elliptical
Type E0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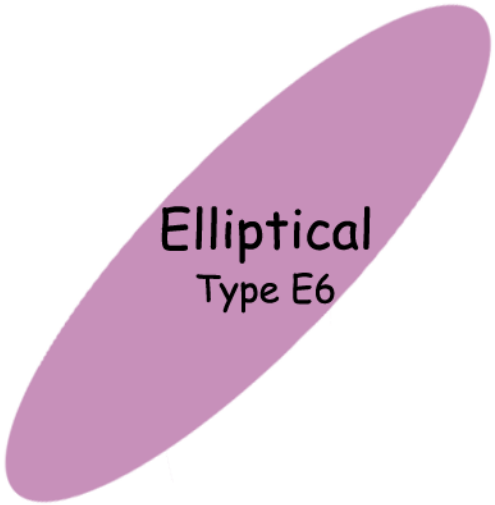
Type E4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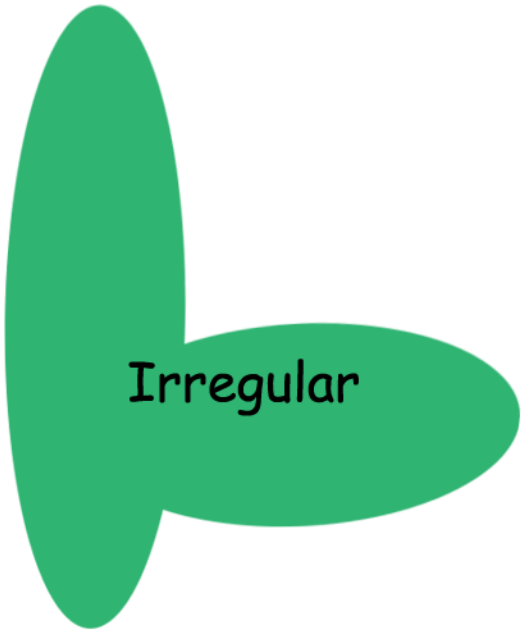
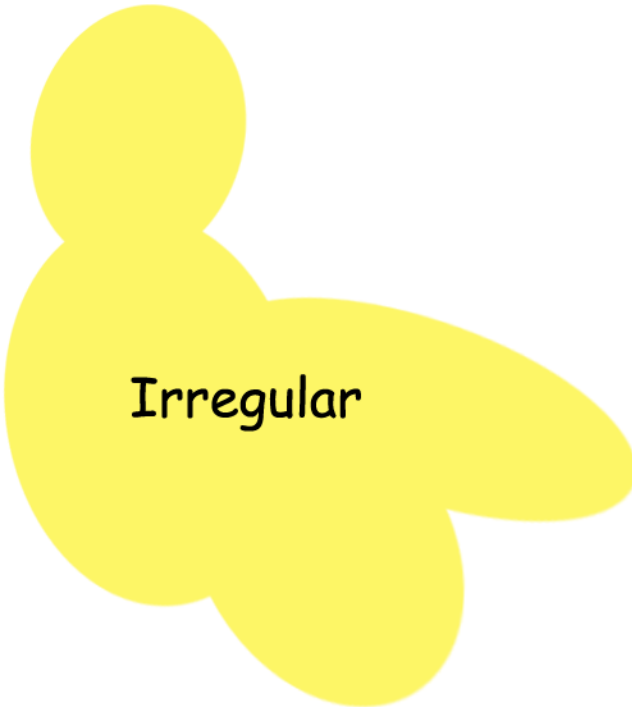
Type E6


Irregular


Irregular


Irregular

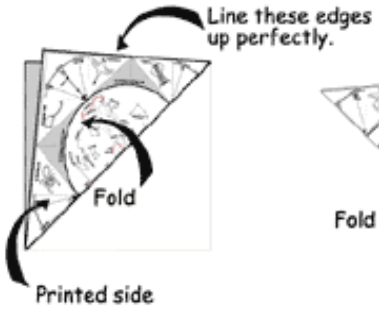
Make a Star Finder

Learn your way aroung the night sky
by finding some of the constellations.

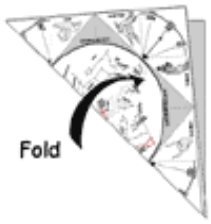
The pattern for the Star Finder for the month of November is included.
To print out the Star Finder pattern for the current month, see the web site at
http://spaceplace.nasa.gov/en/kids/st6starfinder/st6starfinder.shtml.

Color or decorate the Star Finder, if you like. Then cut it out on the solid lines.

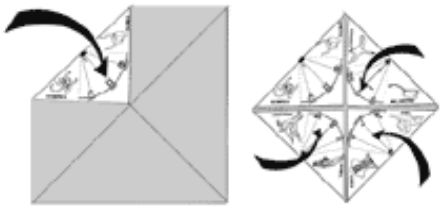
Fold it like this:



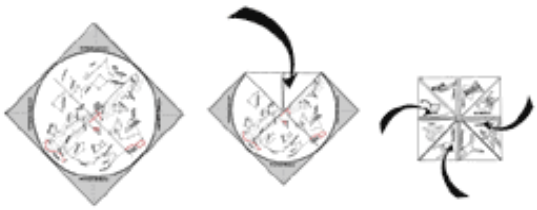
1. Fold paper diagonally.



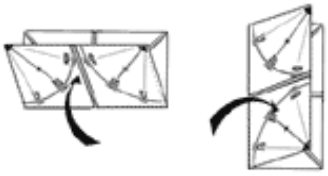
2. Fold the other two corners together.



3. Fold each corner point into the center.

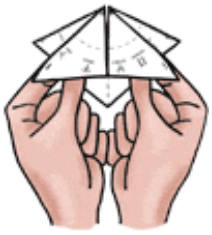


4. Flip the square over, then fold all four of its corners into the center.



5. Fold in half one way, then unfold, and fold in half the other way.

Play the Star Finder game:



1. Stick your thumbs and first two fingers into the four pockets on the bottom of the Star Finder.

2. Ask another person to choose one of the top four squares. Then, depending on the number on the square she chose, open and close the Star Finder that many times (open up and down, close, open side to side, close, etc.). For example, if she chose number 6, open and close the Star Finder 6 times.

3. Then, ask the person to look inside the Star Finder and pick one of the four visible constellations. This time, open and close the Star Finder once for each letter to spell out his choice. For example, if he chose "Lyra," you would open and close the Star Finder 4 times, once for each letter: L - Y - R - A.

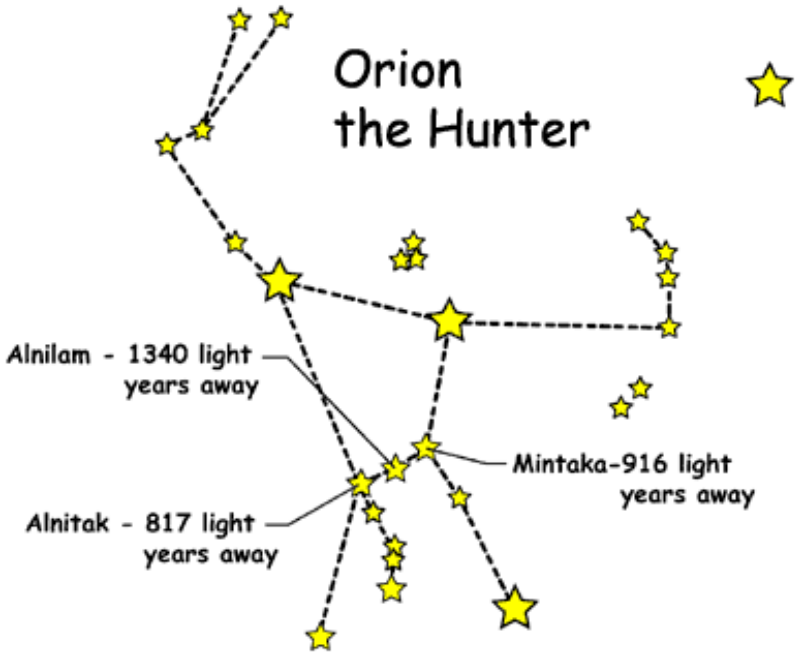
4. Ask the player again to pick one of the four constellations visible. Open the panel to see the name of a constellation (highlighted in red) she will try to find in the sky for this month.

   For some of the months, not every part of the Star Finder may show a highlighted constellation for you to find. In this case, just try to find the constellation that is nearest to the part of the sky you picked. Or, just find any constellation!

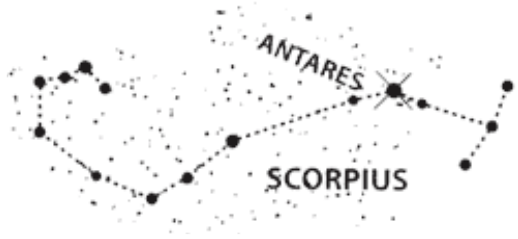
What ARE Constellations Anyway?

Dr. Marc explains all about constellations in his phone message for September 2002 at the web site **http://spaceplace.nasa.gov/en/kids/st6starfinder/st6starfinder.shtml**.

A constellation is group of stars like a dot-to-dot puzzle. If you join the dots—stars, that is—and use lots of imagination, the picture would look like an object, animal, or person. For example, Orion is a group of stars that the Greeks thought looked like a giant hunter with a sword attached to his belt.



Other than making a pattern in Earth's sky, these stars may not be related at all. For example, Alnitak, the star at the left side of Orion's belt, is 817 light years away. (*A light year* is the *distance* light travels in one Earth year, almost 6 trillion miles!) Alnilam, the star in the middle of the belt, is 1340 light years away. And Mintaka at the right side of the belt is 916 light years away. Yet they all appear from Earth to have the same brightness.

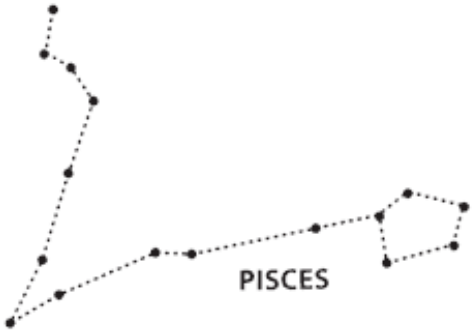


Even the closest star is almost unimaginably far away. Because they are so far away, the shapes and positions of the constellations in Earth's sky change very, very slowly. During one human lifetime, they change hardly at all. So, since humans first noticed the night sky they have navigated by the stars. Sailors have steered their ships by the stars. Even the Apollo astronauts going to the Moon had to know how to navigate by the stars in case their navigation instruments failed.

Finding the Constellations

We see different views of the Universe from where we live as Earth makes its yearly trip around the solar system. That is why we have a different Star Finder for each month, as different constellations come into view. Also, as Earth rotates on its axis toward the east throughout the hours of the night, the whole sky seems to shift toward the west.

The Star Finder charts are for a latitude of 34° N, which is about as far north of the equator as Los Angeles, California. (Charts are from *The Griffith Observer* magazine.) The farther north you are, the more the constellations will be shifted south from the Star Finder charts. The Star Finder charts show the sky at about 10 PM for the first of the month, 9 PM for the middle of the month, and 8 PM for the last of the month. These are local standard times. For months with Daylight Savings Time, star chart times are an hour later.



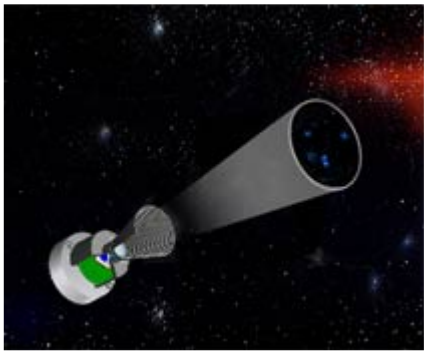
The star charts are maps of the sky overhead. So, to get the directions lined up, hold the map over your head and look up at it, and turn it so the northern horizon side is facing north.

If you live where big city lights drown out the beauty of the stars, you may see only a few of the brightest stars and planets. How sad! But see if you can find at least one or two constellations on a clear, Moonless night.

Ever wondered about the difference between astrology and astronomy?
Find more information at the web site
http://spaceplace.nasa.gov/en/kids/st6starfinder/st6starfinder2.shtml.

What Else are Constellations Good For?

Star patterns are also very helpful for navigating a spacecraft. Most spacecraft have steered by the stars—or at least checked the stars once in a while to make sure the spacecraft was still on course and pointed in the right direction.

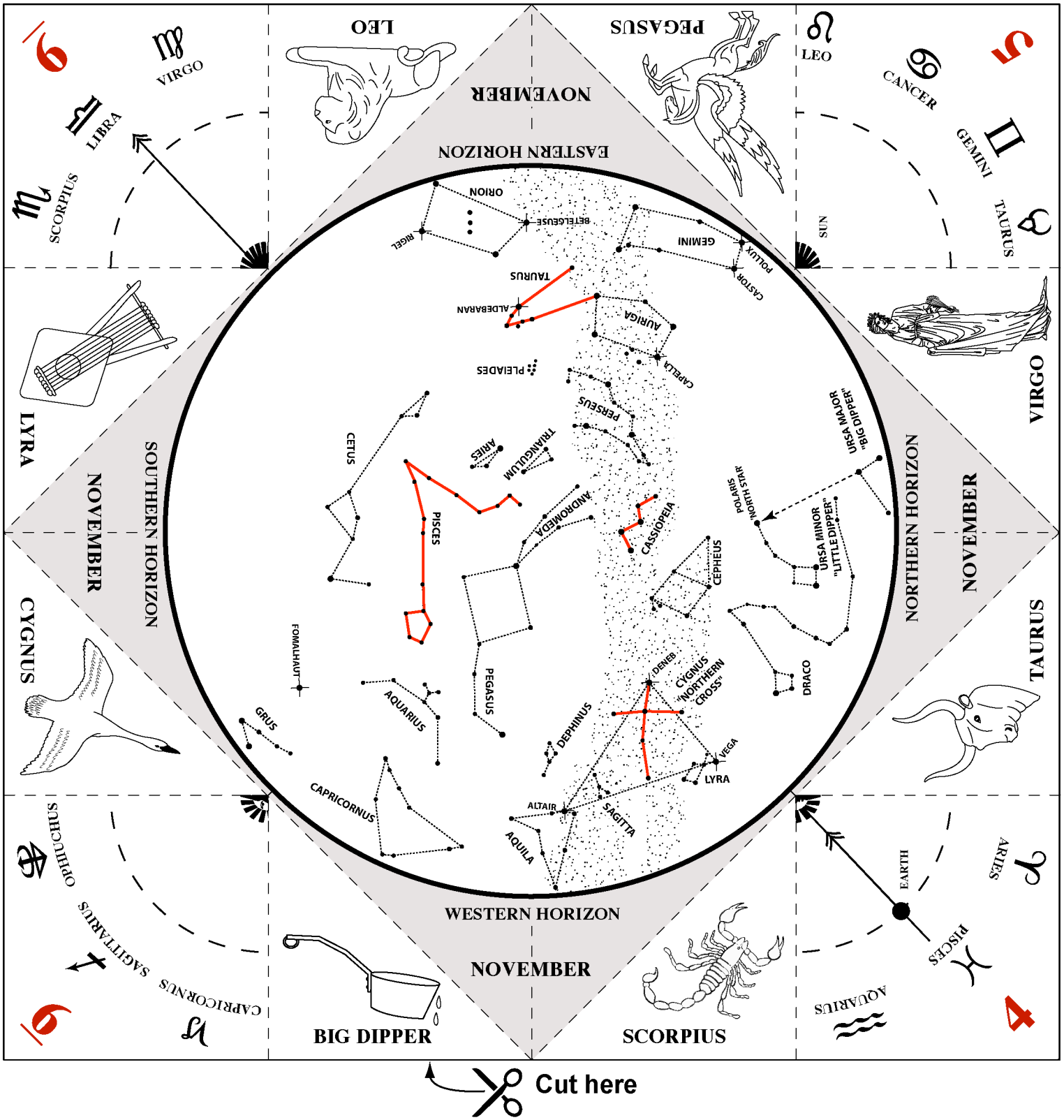


Space Technology 6 is a mission to test a new, very small and energy-efficient kind of reference system. This new system is called an Inertial (in-ER-shul) Stellar Compass, or ISC. The ISC is made up of a star tracker and a gyroscope. Working together, they keep the spacecraft on course.

The star tracker, like a camera, takes a picture of the star patterns in its view and compares the picture with its built-in star maps. This is how it can tell the spacecraft exactly which way it is pointed. In between pictures from the star tracker, the gyroscope tells the spacecraft how it is pointed. Together the star tracker and gyroscope keep the spacecraft stable and oriented in the right direction in space (for example, not flying "upside-down" or sideways). But the gyroscope can hold stable for only a short time. To keep the gyroscope perfectly accurate, information from the star tracker is sent to the gyroscope every few seconds.

The thing that is new and different with the Space Technology 6 ISC is that the two devices are combined into one tiny, light-weight system that needs little power to run.

The ISC will be tested on a Space Shuttle mission. When its new technology is proven, the ISC can be used on future spacecraft sent on missions of discovery.


NOVEMBER
EASTERN HORIZON
LEO
PEGASUS
LEO
VIRGO
LIBRA
SCORPIUS
SUN
CANCER
GEMINI
TAURUS
ORION
BETELGEUSE
RIGEL
GEMINI
POLLUX
CASTOR
TAURUS
ALDEBARAN
AURIGA
CAPELLA
PLEIADES
PERSEUS
CETUS
ARIES
TRIANGULUM
ANDROMEDA
PISCES
CASSIOPEIA
URSA MAJOR "BIG DIPPER"
POLARIS NORTH STAR
URSA MINOR "LITTLE DIPPER"
CEPHEUS
DRACO
LYRA
VIRGO
SOUTHERN HORIZON
NOVEMBER
NORTHERN HORIZON
NOVEMBER
CYGNUS
FOMALHAUT
GRUS
AQUARIUS
PEGASUS
DENEB
CYGNUS "NORTHERN CROSS"
DEPHINUS
VEGA
LYRA
TAURUS
CAPRICORNUS
ALTAIR
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AQUILA
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CAPRICORNUS
EARTH
ARIES
PISCES
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More fun activities are available at spaceplace.nasa.gov/en/kids/

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